

AMENDMENTS TO THE CLAIMS

This listing of the claims shall replace all prior versions and listing of the claims in this application:

1. (Currently amended) A method for protecting consistency groups during a data storage backup operation, comprising:

a) transferring data updates from a host device to a plurality of primary Peer-to-Peer Remote Copy (PPRC) volumes on a primary PPRC unit;

b) upon the primary PPRC volumes forming a new consistency group, transferring the primary PPRC volumes to FlashCopy source volumes on a secondary PPRC unit;

c) attempting to prepare each ~~a~~ FlashCopy source volume for a FlashCopy operation to corresponding FlashCopy target volumes on which a prior consistency group is retained, the attempt including imposing a write-inhibit indicator on each ~~the~~ FlashCopy source volume and generating an Establish-FlashCopy-revertable command;

d) deciding whether the attempt to prepare the FlashCopy source volume is successful;

e) reverting the FlashCopy operation if the preparation of the FlashCopy source volume is unsuccessful, whereby the prior consistency group is maintained in the FlashCopy target volumes;

f) repeating steps c) through e) for each other FlashCopy source volume;
and

g) committing a FlashCopy operation of the consistency group from the FlashCopy source volumes to the corresponding FlashCopy target volumes if the preparation of all FlashCopy source volumes is successful, whereby the prior consistency group retained in the FlashCopy target volumes is replaced by the new consistency group; and

~~reverting the FlashCopy operation if the preparation of any FlashCopy source volume is unsuccessful, whereby the prior consistency group is maintained in the FlashCopy target volumes.~~

2. (Previously presented) The method of claim 1, wherein imposing the write-inhibit indicator prevents the reception of data updates by the FlashCopy source device transmitted from the PPRC source device during a FlashCopy operation.
3. (Original) The method of claim 1, further comprising releasing the write-inhibit indicators if the preparation of all FlashCopy source volumes is successful.
4. (Cancelled)
5. (Currently amended) The method of claim-41, wherein the step of committing the FlashCopy operation comprises generating a Withdraw-FlashCopy-commit command.
6. (Original) The method of claim 5, wherein the step of reverting the FlashCopy operation comprises generating a Withdraw-FlashCopy-revert command.
- 7-13. (Cancelled)
14. (Currently amended) A data storage system, comprising
 - a primary storage controller coupled to receive data updates from at least one host device;
 - a first storage unit coupled to the primary storage controller for storing primary Peer-to-Peer Remote Copy (PPRC) volumes;
 - a secondary storage controller coupled to the primary storage controller;
 - a second storage unit coupled to the secondary storage controller for storing FlashCopy source volumes;
 - a third storage unit coupled to the secondary storage controller for retaining FlashCopy target volumes; and
 - an application executing on the primary storage controller, the application comprising instructions for:

a) transferring data updates from the at least one host device to the primary PPRC volumes;

b) upon the primary PPRC volumes forming a new consistency group, transferring the primary PPRC volumes to the FlashCopy source volumes;

c) attempting to prepare each ~~a~~ FlashCopy source volume for a FlashCopy operation to corresponding FlashCopy target volumes on which a prior consistency group is retained, the attempt including imposing a write-inhibit indicator on each ~~the~~ FlashCopy source volume and generating an Establish-FlashCopy-revertable command;

d) deciding whether the attempt to prepare the FlashCopy source volume is successful;

e) reverting the FlashCopy operation if the preparation of the FlashCopy source volume is unsuccessful, whereby the prior consistency group is maintained in the FlashCopy target volumes;

f) repeating instructions c) through e) for each other FlashCopy source volume; and

g) committing a FlashCopy operation of the new consistency group from the FlashCopy source volumes to the corresponding FlashCopy target volumes if the preparation of all FlashCopy source volumes is successful, whereby the prior consistency group retained in the FlashCopy target volumes is replaced by the new consistency group; and

~~reverting the FlashCopy operation if the preparation of any FlashCopy source volume is unsuccessful, whereby the prior consistency group is maintained in the FlashCopy target volumes.~~

15. (Original) The data storage system of claim 14, further comprising means, responsive to the write-inhibit indicators, for preventing the reception of data updates by the secondary storage controller transmitted by the primary storage controller during a FlashCopy operation.

16. (Original) The data storage system of claim 15, further including means for releasing the write-inhibit indicators if the preparation of all FlashCopy source volumes is successful.

17. (Cancelled)

18. (Currently amended) The data storage system of claim ~~17~~ 15, wherein committing the FlashCopy operation comprises generating a Withdraw-FlashCopy-commit command.

19. (Original) The data storage system of claim 18, wherein reverting the FlashCopy operation comprises generating a Withdraw-FlashCopy-revert command.

20-21. (Cancelled)

22. (Currently amended) A computer program product of a computer readable storage medium usable with a programmable computer, the computer program product having computer-readable code embodied therein for protecting consistency groups during a data storage backup operation, the computer-readable code comprising instructions for:

a) transferring data updates from a host device to primary Peer-to-Peer Remote Copy (PPRC) volumes on a primary PPRC unit;

b) upon the primary PPRC volumes forming a new consistency group, transferring the primary PPRC volumes to FlashCopy source volumes on a secondary PPRC unit;

c) attempting to prepare each ~~a~~ FlashCopy source volume for a FlashCopy operation to corresponding FlashCopy target volumes on which a prior consistency group is retained, the attempt including imposing a write-inhibit indicator on each ~~the~~ FlashCopy source volume and generating an Establish-FlashCopy-revertable command;

d) deciding whether the attempt to prepare the FlashCopy source volume is successful;

e) reverting the FlashCopy operation if the preparation of the FlashCopy source volume is unsuccessful, whereby the prior consistency group is maintained in the FlashCopy target volumes;

f) repeating instructions c) through e) for each other FlashCopy source volume; and

g) committing a FlashCopy operation of the new consistency group from the FlashCopy source volumes to the corresponding FlashCopy target volumes if the preparation of all FlashCopy source volumes is successful, whereby the prior consistency group retained in the FlashCopy target volumes is replaced by the new consistency group; and

~~reverting the FlashCopy operation if the preparation of any FlashCopy source volume is unsuccessful, whereby the prior consistency group is maintained in the FlashCopy target volumes.~~

23. (Previously presented) The computer program product of claim 22, wherein imposing the write-inhibit indicator prevents the reception of data updates by the FlashCopy source device transmitted from the PPRC source device during a FlashCopy operation.

24. (Original) The computer program product of claim 22, the instructions further comprising releasing the write-inhibit indicators if the preparation of all FlashCopy source volumes is successful.

25. (Cancelled)

26. (Currently amended) The computer program product of claim ~~25~~ 22, wherein the instructions for committing the FlashCopy operation comprises instructions for generating a Withdraw-FlashCopy-commit command.

27. (Original) The computer program product of claim 26, wherein the instructions for reverting the FlashCopy operation comprises instructions for generating a Withdraw-FlashCopy-revert command.

28-29. (Cancelled)